

Fuzzy Simulated Evolution Algorithm For Topology Design Of Campus networks

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Summary

The topology design of campus networks is a hard constrained combinatorial optimization problem. It consists of deciding the number, type, and location of the active network elements (nodes) and links. This choice is dictated by physical and technological constraints and must optimize several objectives. Example of objectives are monetary cost, network delay, and hop count between communicating pairs. Furthermore, due to the nondeterministic nature of network traffic and other design parameters, the objective criteria are imprecise. Fuzzy logic provides a suitable mathematical framework in such a situation. We present an approach based on the simulated evolution algorithm for the design of campus network topology. The two main phases of the algorithm, namely, evaluation and allocation, have been fuzzified. To diversify the search, we have also incorporated tabu search-based characteristics in the allocation phase of the SE algorithm. This approach is then compared with the simulated annealing algorithm, which is another well-known heuristic. Results show that on all test cases the simulated evolution algorithm exhibits more intelligent search of the solution subspace and was able to find better solutions than simulated annealing

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